(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 586 247 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
08.07.1998 Bulletin 1998/28

(51) Int Cl.[6]: **G11B 15/18**, G11B 15/10, G11B 15/46

(21) Application number: **93306933.8**

(22) Date of filing: **02.09.1993**

(54) Playback speed control systems for reproducing apparatuses

Wiedergabegeschwindigkeitssteuerungsverfahren für Wiedergabegeräte

Système de commande de vitesse de restitution pour appareils de reproduction

(84) Designated Contracting States:
DE FR GB

(30) Priority: **04.09.1992 JP 236992/92**
02.11.1992 JP 294650/92

(43) Date of publication of application:
09.03.1994 Bulletin 1994/10

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(56) References cited:
EP-A- 0 188 162
EP-A- 0 198 658
FR-A- 2 358 071
US-A- 4 139 872

- **PATENT ABSTRACTS OF JAPAN vol. 16, no. 80 (P-1318)26 February 1992 & JP-A-03 268 258**
- **PATENT ABSTRACTS OF JAPAN vol. 16, no. 216 (P-1356)21 May 1992 & JP-A-04 038 743**

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Description

This invention relates to playback speed control systems for reproducing apparatuses, for example video tape recorders (VTRs).

It is known for the playback speed of a VTR to be controlled in accordance with a rotational speed of a dial which is called a jog dial.

FR-A-2 358 071 (GB-A-1 568 877) discloses a video signal reproducing apparatus having a dial, means for detecting the rotation of the dial and playback control means controlling speed of playback in accordance with the speed of rotation of the dial.

EP-A-0 188 612 discloses a playback speed control system for reproducing apparatus comprising: a dial, rotational speed detecting means for detecting the rotational speed of said dial and generating an output signal; and playback speed controlling means for controlling the playback speed in accordance with the output signal of said rotational speed detecting means, said playback speed controlling means comprising: memory means for storing a table showing a relationship between a rotational speed of said dial and the corresponding playback speed, wherein rotational speeds of said dial within a certain range (4 ranges are shown) correspond to a constant playback speed (x2, x1, "slow" and "field").

Fig. 1 of the accompanying drawings shows an example of a previously proposed playback speed control system for a VTR. In Fig. 1, reference numeral 1 is a jog dial. Reference numeral 2 is a frequency generator mounted on a rotational axis of dial 1. In a conventional way, frequency generator 2 optically or magnetically generates pulses (FG pulses) P FG whose frequency corresponds to a rotational speed of dial 1.

Pulses P FG generated by frequency generator 2 are supplied to a counter 3 and are counted thereby in a certain period. Count data D PC obtained from counter 3 is supplied to an arithmetic processing unit 4 and is averaged by integration calculation thereby.

When a man rotates dial 1 in order to keep a constant playback speed, fluctuation of the rotational speed of dial 1 cannot be avoided. Therefore, FG pulses P FG having the corresponding fluctuation are generated by frequency generator 2. Because counter 3 counts FG pulses P FG in a certain period to make count data D PC, the rotation fluctuation of dial 1 results in the fluctuation of count data D PC. For this reason, arithmetic processing unit 4 averages the count data D PC by integration calculation so that the fluctuation of count data D PC is eliminated.

Count data D PCA averaged by arithmetic processing unit 4 is supplied to a tape transport speed command unit 5. Tape transport speed command unit 5 converts count data D PCA to a rotational speed of dial 1 and further converts it to a tape transport speed corresponding to the obtained rotational speed. To obtain the tape transport speed corresponding to the rotational speed, a table as shown in Fig. 2 is used, showing a relationship between a rotational speed of dial 1 and a tape transport speed. The table is stored, for example, in a ROM. Fig. 2 shows a relationship between a rotational speed of dial 1 in one direction and a tape transport speed. Although not shown in Fig. 2, when dial 1 is rotated in the other direction, a tape transport speed has a minus value.

Tape transport speed command unit 5 generates a command C SP to indicate a tape transport speed calculated in the above way. Command C SP is supplied to a tape transport system 6 so that a tape transport speed is controlled to be a speed indicated by command C SP.

Fig. 3 shows a flow-chart of processes of primary elements of the system or apparatus as shown in Fig. 1. In Fig. 3, FG pulsesP FG are counted in step S11, the count is integrated in step S12, command C SP is generated in step S13 based on the integral value and the tape speed control curve as shown in Fig. 2, and command C SP is supplied to tape transport system 6 in step S14.

According to an example as shown in Fig. 1, a table as shown in Fig. 2 is used such that when a rotational speed of dial 1 varies from 0 to 3 rotations per second, a tape transport speed simply varies from 0 to 3 times a normal speed. Because of the use of this table, a user needs to rotate dial 1 at a constant rotational speed in order to keep the constant tape transport speed in a range of 0 to 3 times a normal speed. It is very hard for the user to rotate dial 1 at a constant speed.

As explained above, in the previously proposed apparatus for controlling tape transport speed according to a rotational speed of dial 1, dial pulses (FG pulses PFG) may be averaged by some integral calculation. Tape transport system 6 is controlled according to command C SP based on the averaged pulse data (averaged count data D PCA).

However, when tape transport system 6 is controlled according to the averaged pulse data, a response of the tape transport speed control to the rotational speed of dial 1 is delayed due to the averaging process over the whole range of tape transport speeds to be controlled. Accordingly, an ease of use of the apparatus would be made worse.

On the other hand, if dial pulses (FG pulses P FG) are directly used without the integral calculation, fluctuation of the rotation of dial 1 would result in fluctuation of the tape speed.

A playback speed control system according to a first aspect of the invention comprises a playback speed control system for a reproducing apparatus comprising:

a dial;

rotational speed detecting means for detecting a rotational speed of said dial and generating an output signal; and

comparing means for comparing the output signal of said rotational speed detecting means with a ref-

erence speed and for determining whether the rotational speed is higher than the reference speed; and

characterised by

averaging means for averaging the output signal of said rotational speed detecting means; and
controlling means for controlling a playback speed in accordance with the averaged output signal from said averaging means when said comparing means determines that the rotational speed is higher than the reference speed and otherwise controlling the playback speed in accordance with the output signal supplied directly from said rotational speed detecting means.

The playback speed controlling means may include a table showing a relationship between a rotational speed of the dial and a playback speed. The table is made such that rotational speeds within a certain range correspond to a constant playback speed. The output of the rotational speed detecting means is supplied to the playback speed controlling means directly or after being averaged. The apparatus may comprises table content changing means for changing a content of the table in the playback speed controlling means.

Since rotational speeds within a certain range correspond to a constant playback speed, a constant playback speed is stably kept even if a rotational speed of the dial varies within that certain range.

When the detect output of the rotational speed detecting means is averaged and then, is supplied to the playback speed commanding means, a response characteristic of the playback speed control becomes worse. But rotational fluctuation of the dial can be restrained. On the other hand, when the detect output of the rotational speed detecting means is directly supplied to the playback speed commanding means, rotational fluctuation of the dial cannot be restrained, but a response characteristic of the playback speed control becomes better. Because of the means for changing the content of the table, changing the playback speed to be kept stably can be easily changed.

A playback speed control system according to another aspect of the present invention comprises pulse generating means for generating pulses corresponding to the rotation of a dial, integrating means for comparing the number of the pulses generated by the pulse generating means with plural reference values, for determining whether the pulse number is larger than, smaller than or between the plural reference values and for integrating the pulse number generated by the pulse generating means in several ways in accordance with the determination, and controlling means for providing information for the transport speed of the recording medium in accordance with the integrated pulse number obtained from the integrating means, whereby the apparatus controls a recording medium transport system for transporting the recording medium so that a playback speed is controlled in accordance with the rotation of the dial.

A magnetic tape can be one example of the recording medium which is used in the present invention. When a tape medium is used, a playback speed may be equivalent to a tape transport speed. However, if a disc medium is used, a playback speed can be controlled by controlling track jumps in accordance with the rotation of the dial in a conventional way.

A playback speed control system embodying the invention may control a tape transport speed in accordance with the rotational speed of a jog dial. Specifically, when the dial is rotated at low speed, dial FG pulses may themselves be directly used as pulse data in accordance with which the tape transport system is controlled. When the dial is rotated at high speed, the pulse data is obtained by integrating the dial FG pulses, using some FG arithmetic calculation. Then, the tape transport system is controlled in accordance with the pulse data so obtained. Therefore, during the low speed rotation of the dial, the response characteristic between the rotational speed of the dial and the tape transport speed will be improved. During the high speed rotation of the dial, fluctuation of the tape movement due to fluctuation of the dial rotation will be restrained.

In a playback speed control system embodying the present invention, whether the integration of the pulse number should be carried out or not (or the degree of the integration of the pulse number) is determined, depending upon the rotational speed (the number of rotations) of the dial. For example, when a tape transport speed is equal to or slower than a normal speed, the pulse number is not integrated. Therefore, the responsive characteristic between the rotational speed of the dial and the tape transport speed can be improved because there is no response delay due to integrating the pulse number. On the other hand, when the tape transport speed is higher than a normal speed, the number of the pulses is integrated. Therefore, fluctuation of the tape movement due to fluctuation of the dial rotation is restrained.

Embodiments of the invention described below provide: a playback speed control system for stably keeping a constant playback speed; a playback speed control system having a quick response characteristic; and a playback speed control system providing a small fluctuation of playback speed without degradation in ease of use.

The invention will now be further described, by way of illustrative and non-limiting example, with reference to the accompanying drawings, in which:

Fig. 1 is a block diagram of a previously proposed playback speed control system;
Fig. 2 shows a relationship between a dial rotational speed and a tape transport speed in the system of

Fig. 1;
Fig. 3 is a flow-chart of processes performed by primary elements of the system of Fig. 1;
Fig. 4 is a block diagram of a playback speed control system;
Fig. 5 is a block diagram of a tape transport speed command unit of the system of Fig. 4;
Fig. 6 shows a relationship between a dial rotational speed and a tape transport speed in the system of Fig. 4;
Fig. 7 represents a change of tape transport speed as time elapses in the system of Fig. 4;
Fig. 8 represents a change of tape transport speed as time elapses in a previously proposed system;
Fig. 9 shows an example of change of dial rotational speed as time elapses; and
Fig. 10 is a flow-chart of processes performed by primary elements of an embodiment of the invention.

A playback speed control system will now be described with reference to Fig. 4. The system is a playback speed control system for a VCR. In Fig. 4, elements which have been already shown in Fig. 1 are designated by the same reference numerals and explanation thereof will be omitted.

In the system, count data D PC generated by counter 3 is directly supplied to a tape transport speed command unit 5. Fig. 5 shows the construction of tape transport speed command unit 5. Reference numerals 51, 52, 53, 54 and 55 - 57 are a CPU, a RAM, a ROM, a bus and interfaces, respectively.

Count data D PC is supplied from counter 3 through interface 56 to CPU 51. A command C SP indicating a tape transport speed is generated by CPU 51 and is supplied through interface 57 to a tape transport system 6.

As shown in Fig. 6, ROM 53 stores a table to show a relationship between a rotational speed of dial 1 and a corresponding tape transport speed. When a rotational speed of dial 1 varies from 0 to 2 rotations per second, a corresponding tape transport speed varies from 0 to 1 times normal speed. Similarly, when a rotational speed of dial 1 varies from 3 to 4 rotations per second, a corresponding tape speed varies from 1 to 3 times normal speed. When a rotational speed of dial 1 varies within a range of 2 to 3 rotations per second, a corresponding tape transport speed is kept constantly at a normal speed.

Fig. 6 only shows a relationship between a rotational speed of dial 1 in one direction and a tape transport speed. Although not shown in Fig. 6, when dial 1 is rotated in the other direction, a corresponding tape transport speed has a minus value.

Tape transport command unit 5 converts count data D PC to a rotational speed of dial 1 and further converts it to a tape transport speed corresponding to the obtained rotational speed. To obtain the tape transport speed corresponding to the rotational speed, the table as shown in Fig. 6 is used.

The table as shown in Fig. 6 may be stored in RAM 52 instead of ROM 53. In this case, as shown in Fig. 5, input means 7 such as a keyboard may be connected through interface 55 to CPU 51 so that the table stored in RAM 52 can be changed.

The system is constructed as explained above and other remaining elements are constructed in the same manner as shown in Fig. 1. In this system, because the table in tape transport speed command unit 5 is such that a tape transport speed is constant at a normal speed when a rotational speed of dial 1 varies within a range of 2 to 3 rotations per second, playback speed command unit 5 continues to supply command C SP indicating a normal speed to tape transport system 6 so that the tape transport speed is stably kept at a normal speed, even if a user varies a rotational speed of dial 1 within a range of 2 to 3 rotations per second.

Because count data D PC generated by counter 3 is directly supplied to tape transport speed command unit 5, a response characteristic of controlling a tape transport speed becomes better than in a system in which count data D PC is integrated and then, supplied to tape transport speed command unit 5.

Figs. 7 and 8 respectively show changes of a tape transport speed in the embodiments of the present invention and in a previously proposed system when a rotational speed of dial 1 varies as shown in Fig. 9.

Let us compare areas 8-a and 8-c in Fig. 7 with areas 9-a and 9-c in Fig. 8. A tape transport speed cannot be kept at a constant speed in the previously proposed system while a tape transport speed can be stably kept at +1 or -1 time a normal speed in the embodiment.

Let us compare a tape transport speed at time t in area 8-b as shown in Fig. 7 with that of area 9-b as shown in Fig. 8. Because a rotational speed of dial 1 at time t is 2 rotations per second as shown in Fig. 9, a tape speed at time t should be a normal speed both in the previous system and in the embodiments, referring to Figs.6 and 2, respectively. However, a tape speed at time t does not reach a normal speed in the previous system (see area 9-d in Fig. 8) while a tape speed at time t is a normal speed in the embodiments of the invention (see area 8-d in Fig. 7). Because of this, it is noted that a response characteristic of a tape transport speed control is better in the embodiments than in the previously proposed system.

By using a table stored in RAM 52 and changing its content by input means 7, any change of a tape transport speed to be kept constant can be made. For example, in Fig. 6, a tape transport speed is kept constantly at a normal speed when a rotational speed of dial 1 varies within a range of 2 to 3 rotations per second. However, a tape speed can be kept constantly at any speed when a rotational speed of dial 1 varies within any other range.

In the system as shown in Fig. 4, since count data D PC generated by counter 3 is directly, without being

integrated, supplied to tape transport speed command unit 5, a response characteristic of the tape speed control is improved, but a rotational fluctuation of dial 1 cannot be restrained. In the alternative, count data D PC generated by counter 3 could be averaged and then be supplied to tape transport speed command unit 5 so that the first priority can be put on restraint of rotational fluctuation of dial 1.

Although the present invention applies to a playback speed control system for a VCR a playback speed control system according to the present invention may apply to a reproducing apparatus using another type of recording medium such as a disk.

According to the system described above, because a table in the tape transport speed commanding means is made such that rotational speeds in a certain range corresponds to a constant playback speed, the tape transport speed commanding means continues to supply a command to keep a constant speed, even if the rotation of the dial varies within the certain range.

By averaging the detect output of the rotational speed detecting means and supplying it to the tape transport speed commanding means, a response characteristic of playback speed control becomes worse, but rotational fluctuation of the dial can be restrained. On the other hand, by directly supplying the detect output of the rotational speed detecting means to the playback speed commanding means, a rotational fluctuation of the dial cannot be restrained, but a response characteristic of playback speed control becomes better.

By providing means for changing the content of the table in the playback speed means, a playback speed to be kept stably can be easily changed.

Next, an embodiment of a playback speed control system according to the invention will be explained, referring to drawings.

In the embodiment, ROM 53 stores a table as shown in Fig. 2 as used in the previously proposed system. The table shows a relationship between a rotational speed of dial 1 and a corresponding tape transport speed so that the tape speed corresponding to the rotational speed of dial 1 can be obtained. When a rotational speed of dial 1 varies from 0 to 3 rotations per second, a corresponding tape transport speed also simply varies from 0 to 3 times a normal speed. When dial 1 rotates in the other direction, a tape speed has a minus value.

A table as shown on Fig. 2 can be stored in RAM 52 instead of ROM 53. In this alternative, an input means 7 such as an keyboard in Fig. 5 can be connected through interface 55 to CPU 51 so that the table stored in RAM 52 may be chargeable.

Tape transport speed command unit 15 in the embodiment outputs a tape transport speed in accordance with a rotational speed of dial 1, compares count data D PC from counter 3 with a reference value and determines whether count data D PC is larger than the reference value. When count data D PC is larger than the reference value, tape transport speed command unit 15 integrates count data D PC and uses the result of the integrating in order to generate command SC SP providing a tape transport speed. When count data D PC is not larger than the reference value, tape transport speed command unit 15 simply uses count data D PC as command SC SP and send it to tape transport system 6.

Specifically, a value corresponding to a normal tape transport speed is used as the reference value in tape transport speed command unit 15. Therefore, tape transport speed command unit 15 determines whether count data D PC from counter 3 is larger than the value corresponding to the normal tape transport speed (the reference value). When tape transport speed command unit 15 determines that count data D PC is larger than the reference value, it integrates count data D PC and supplies to tape transport system 6 command SC SP obtained after the integration calculation. When tape transport speed command unit 15 determines that count data D PC is not larger than the reference value, it supplies count data D PC (without being integrated) as command SC SP to tape transport system 6.

Fig. 10 shows a flow-chart of processes of primary elements of the apparatus as shown in Figs. 4 and 5. In Fig. 10, FG pulses P FG is counted in step S1, the determination whether count data D PC is larger than the references values is made in step S2. If it is determined in step S2 that count data D PC is larger than the reference value (in case of "Yes" determination), count data D PC is integrated in step S3, and then, step S4 is carried out. If it is determined in step S2 that count data D PC is not larger than the references value(in case of "No" determination), step S4 is immediately carried out, skipping step S3. In step S4, command SC SP is generated in accordance with a tape speed control curve as shown in Fig. 2. Then, in step S5, command SC SP is sent to tape transport system 6.

In the apparatus according to the embodiment, when a tape is controlled to be transported at a slow speed such as a normal (1 time) speed, dial 1 also rotates slowly so that count data D PC is not larger than the reference value. In this case, integration calculation is not carried out on count data D PC. Command SC SP is obtained from the tape speed control curve, using unprocessed count data D PC and command SC SP is supplied to tape transport system 6. Accordingly, a tape transport control can be done without a response delay due to the integration calculation. In a previously proposed system, because an integration calculation is always carried out on count data D PC as shown in Fig. 6, a response of tape transport speed control command to the rotation of the dial is delayed when the tape is transported at a slow speed.

On the other hand, when the tape is controlled to be transported at a high speed, count data D PC is larger than the references value so that the integration calculation is carried out on count data D PC. Because of the

integration calculation, fluctuation of count data D PC due to rotational fluctuation of dial 1 is restrained. Command SC SP is obtained from the tape speed control curve, using count data D PC with restrained fluctuation and is supplied to tape transport system 6. Accordingly, a tape transport control can be done with restrained fluctuation.

Although the reference value is set at 2 rotations per second of dial 1 (1 time a normal tape speed) as shown in Fig. 2 in the second embodiment, the reference value can be set at any other rotational speed of dial 1(any other tape speed), without limiting it to this particular embodiment.

According to the embodiment as described above, in a high tape speed range in which a smoother response of tape transport speed is required with respect to rotational speed of dial 1, rotational fluctuation of dial 1 is restrained by the integration calculation. In a slow tape speed range in which a quicker response of tape transport speed is required, a response characteristic is improved because no integration calculation is carried out. Therefore, an operational response in a whole range of tape transport speed is improved.

As explained above, in a recording medium transport speed control apparatus according to the embodiment of present invention, a pulse count data generated corresponding to the dial rotation is compared with a reference value and the pulse count data is integrated when the pulse count data is larger than the reference value. Because a playback speed is controlled in accordance with the pulse count data, a playback speed control can be achieved with a restrained fluctuation of tape transport and without sacrificing an ease of use of the apparatus.

Although the embodiment as explained above uses a single reference value to compare with count data D PC, plural reference values may be used so that a suitable one of different integration calculations is selected in accordance with the comparison result of count data D PC with each reference value.

In an apparatus according to a further embodiment, tape transport speed command unit 15 comprises comparing means for comparing count data D PC with plural reference values, integrating means for determining whether count data D PC is larger than, smaller than or between each of the plural reference values and for processing count data D PC using a different integration calculation depending upon the comparison result, and determining means for determining a tape transport speed of a magnetic tape in accordance with the integration value supplied from the integrating means. Then, tape transport system for transporting the magnetic tape is controlled in accordance with command SC SP providing a tape transport speed of the magnetic tape which is determined by tape transport speed command unit 15. Since the comparing means, the integrating means and the determining means are included in CPU 51 as shown in Fig. 5, they are not shown particularly in the figures.

In the concrete, tape transport speed command unit 15 according to the further embodiment is provided with n reference values. Any three reference values m-1, m, m+1 are selected among the n reference values. Tape transport speed command unit 15 determines whether count data D PC is not larger than (or smaller than) the reference value m-1, whether count data D PC is larger than(or not smaller than) the reference value m-1 but not larger than (or smaller than) the reference value m, or whether count data D PC is larger than (or not smaller than) the reference value m but not larger than (or smaller than) the reference value m+1. Then, tape transport speed command unit 15 chooses one of the different tape transport speeds calculated by different integrations. Tape transport speed command unit 15 chooses the best one based upon the above comparison determination and supplies to tape transport system 6 command SC SP corresponding to the determined tape transport speed.

In the above further embodiment, a finer control of the tape transport speed can be achieved depending upon the dial rotational speed.

Claims

1. A playback speed control system for a reproducing apparatus comprising:

   a dial (1);
   rotational speed detecting means (2, 3) for detecting a rotational speed of said dial and generating an output signal; and
   comparing means (5) for comparing the output signal of said rotational speed detecting means with a reference speed and for determining whether the rotational speed is higher than the reference speed; and

   characterised by

   averaging means (5) for averaging the output signal of said rotational speed detecting means; and
   controlling means (5) for controlling a playback speed in accordance with the averaged output signal from said averaging means when said comparing means determines that the rotational speed is higher than the reference speed and otherwise controlling the playback speed in accordance with the output signal supplied directly from said rotational speed detecting means.

2. A playback speed control system according to claim 1, wherein said reference speed is less than a normal playback speed.

3. A playback speed control system for a reproducing apparatus, comprising:

   a dial (1);
   rotational speed detecting means (2, 3) for detecting a rotational speed of said dial and generating an output signal; and
   comparing means (5) for comparing the output signal of said rotational speed detecting means with plural reference speeds and for determining whether the rotational speed is higher than, smaller than or between the plural reference speeds; and characterised by
   averaging means (5) for averaging the output signal of said rotational speed detecting means in several different ways in accordance with the determination by said comparing means; and
   controlling means (5) for controlling a playback speed in accordance with the averaged output signal from said averaging means.

4. A playback speed control system according to claim 1, claim 2 or claim 3, wherein a tape is used as a recording medium from which signals are reproduced at the playback speed.

5. A playback speed control system according to claim 4; further comprising: tape transporting means (6) responsive to said controlling means (5), for transporting said tape at a transport speed corresponding to said playback speed.

6. A playback speed control system according to claim 1, claim 2 or claim 3, wherein said rotational speed detecting means includes pulse generating means (2) for generating pulses in accordance with the rotations of said dial.

7. A playback speed control system according to claim 6, wherein said comparing means (5) compares the number of the pulses generated by said pulse generating means (2) with a reference value corresponding to said reference speed and determines whether the number of the pulses is larger than the reference value.

8. A playback speed control system according to claim 7, wherein said averaging means (5) includes integrating means for integrating the number of the pulses generated by said pulse generating means (5) when said comparing means determines that the number of the pulses is larger than the reference value.

9. A playback speed control system according to any preceding claim wherein the controlling means (5) stores a table of the relationship between the rotational speed of the dial (1) and the corresponding playback speed.

10. A system according to claim 9, further comprising means (7) for changing the table.

Patentansprüche

1. Wiedergabegeschwindigkeitssteuerungssystem für ein Wiedergabegerät, bestehend aus

   einer Skalenscheibe (1),
   einer Drehgeschwindigkeitsdetektoreinrichtung (2, 3) zum Detektieren einer Drehgeschwindigkeit der Skalenscheibe und Erzeugen eines Ausgangssignals und
   einer Vergleichseinrichtung (5) zum Vergleich des Ausgangssignals der Drehgeschwindigkeitsdetektoreinrichtung mit einer Referenzgeschwindigkeit und Feststellen, ob die Drehgeschwindigkeit höher als die Referenzgeschwindigkeit ist,

   gekennzeichnet durch

   einer Mittelwertbildungseinrichtung zur Bildung eines Mittelwertes des Ausgangssignals der Drehgeschwindigkeitsdetektoreinrichtung und
   einer Steuerungseinrichtung (5) zur Steuerung einer Wiedergabegeschwindigkeit in Übereinstimmung mit dem gemittelten Ausgangssignal aus der Mittelwertbildungseinrichtung, wenn die Vergleichseinrichtung feststellt, daß die Drehgeschwindigkeit höher als die Referenzgeschwindigkeit ist, und andernfalls zur Steuerung der Wiedergabegeschwindigkeit in Übereinstimmung mit dem von der Drehgeschwindigkeitsdetektoreinrichtung direkt bereitgestellten Ausgangssignal.

2. Wiedergabegeschwindigkeitsteuerungssystem nach Anspruch 1 wobei die Referenzgeschwindigkeit kleiner als eine normale Wiedergabegeschwindigkeit ist.

3. Wiedergabegeschwindigkeitsteuerungssystem für ein Wiedergabegerät, bestehend aus

   einer Skalenscheibe (1),
   einer Drehgeschwindigkeitsdetektoreinrichtung (2, 3) zum Detektieren einer Drehgeschwindigkeit der Skalenscheibe und Erzeugen eines Ausgangssignals und
   einer Vergleichseinrichtung (5) zum Vergleich des Ausgangssignals der Drehgeschwindigkeitsdetektoreinrichtung mit mehreren Referenzgeschwindigkeiten und zum Feststellen, ob die Drehgeschwindigkeit höher oder kleiner als die mehreren Referenzgeschwindigkeiten

ist oder zwischen den mehreren Referenzgeschwindigkeiten liegt,

gekennzeichnet durch

eine Mittelwertbildungseinrichtung (5) zur Bildung eines Mittelwertes des Ausgangssignals der Drehgeschwindigkeitsdetektoreinrichtung in Übereinstimmung mit der Feststellung durch die Vergleichseinrichtung auf mehrere verschiedene Art und Weisen, und
eine Steuerungseinrichtung (5) zur Steuerung einer Wiedergabegeschwindigkeit in Übereinstimmung mit dem gemittelten Ausgangssignal aus der Mittelwertbildungseinrichtung.

4. Wiedergabegeschwindigkeitsteuerungssystem nach Anspruch 1, Anspruch 2 oder Anspruch 3, wobei als Aufzeichnungsmedium ein Band verwendet ist, von welchem Signale mit der Wiedergabegeschwindigkeit wiedergegeben werden.

5. Wiedergabegeschwindigkeitsteuerungssystem nach Anspruch 4, mit einer auf die Steuerungseinrichtung (5) ansprechenden Bandtransporteinrichtung (6) zum Transportieren des Bandes mit einer mit der Wiedergabegeschwindigkeit korrespondierenden Transportgeschwindigkeit.

6. Wiedergabegeschwindigkeitsteuerungssystem nach Anspruch 1, Anspruch 2 oder Anspruch 3, wobei die Drehgeschwindigkeitsdetektoreinrichtung eine Impulserzeugungseinrichtung (2) zur Erzeugung von Impulsen in Übereinstimmung mit den Drehungen der Skalenscheibe aufweist.

7. Wiedergabegeschwindigkeitsteuerungssystem nach Anspruch 6, wobei die Vergleichseinrichtung (5) die Zahl der von der Impulserzeugungseinrichtung erzeugten Impulse mit einem Referenzwert vergleicht, der mit der Referenzgeschwindigkeit korrespondiert, und feststellt, ob die Zahl der Impulse größer als der Referenzwert ist.

8. Wiedergabegeschwindigkeitsteuerungssystem nach Anspruch 7, wobei die Mittelwertbildungseinrichtung (5) aufweist eine Integrationseinrichtung zur Integration der Zahl der von der Impulserzeugungseinrichtung (5) erzeugten Impulse, wenn die Vergleichseinrichtung feststellt, daß die Zahl der Impulse größer als der Referenzwert ist.

9. Wiedergabegeschwindigkeitsteuerungssystem nach einem der vorhergehenden Ansprüche, wobei die Steuerungseinrichtung (5) eine Tabelle der Beziehung zwischen der Drehgeschwindigkeit der Skalenscheibe (1) und der korrespondierenden Wiedergabegeschwindigkeit speichert.

10. System nach Anspruch 9, mit einer Einrichtung (7) zur Änderung der Tabelle.

Revendications

1. Système de commande de vitesse de lecture pour un appareil de reproduction comprenant :

un bouton 1 ;
un moyen de détection de vitesse de rotation (2, 3) pour détecter une vitesse de rotation dudit bouton et pour générer un signal de sortie ; et
un moyen de comparaison (5) pour comparer le signal de sortie dudit moyen de détection de vitesse de rotation à une vitesse de référence et pour déterminer si la vitesse de rotation est plus élevée que la vitesse de référence ; et

caractérisé par

un moyen de calcul de moyenne (5) pour calculer la moyenne du signal de sortie dudit moyen de détection de vitesse de rotation ; et
un moyen de commande (5) pour commander une vitesse de lecture selon le signal de sortie de moyenne dudit moyen de calcul de moyenne lorsque ledit moyen de comparaison détermine que la vitesse de rotation est plus élevée que la vitesse de référence et sinon pour commander la vitesse de lecture selon le signal de sortie fourni directement par ledit moyen de détection de vitesse de rotation.

2. Système de commande de vitesse de lecture selon la revendication 1, dans lequel ladite vitesse de référence est plus petite qu'une vitesse de lecture normale.

3. Système de commande de vitesse de lecture pour un appareil de reproduction, comprenant :

un bouton (1) ;
un moyen de détection de vitesse de rotation (2, 3) pour détecter une vitesse de rotation dudit bouton et pour générer un signal de sortie ; et
un moyen de comparaison (5) pour comparer le signal de sortie dudit moyen de détection de vitesse de rotation à plusieurs vitesses de référence et pour déterminer si la vitesse de rotation est plus grande, plus petite ou entre plusieurs vitesses de référence ; et caractérisé par
un moyen de calcul de moyenne (5) pour calculer la moyenne du signal de sortie dudit moyen de détection de vitesse de rotation de plusieurs manières différentes selon la déter-

mination par ledit moyen de comparaison ; et un moyen de commande (5) pour commander une vitesse de lecture selon le signal de sortie de calcul de moyenne dudit moyen de calcul de moyenne.

4. Système de commande de vitesse de lecture selon la revendication 1, la revendication 2 ou la revendication 3, dans lequel une bande est utilisée comme support d'enregistrement à partir desquelles des signaux sont reproduits aux vitesses de lecture.

5. Système de commande de vitesse de lecture selon la revendication 4, comprenant en outre : un moyen de transport de bande (6) sensible audit moyen de commande (5) pour transporter ladite bande à une vitesse de transport correspondant à ladite vitesse de lecture.

6. Système de commande de vitesse de lecture selon la revendication 1, la revendication 2 ou la revendication 3, dans lequel ledit moyen de détection de vitesse de rotation comprend un moyen de génération d'impulsions (2) pour générer des impulsions selon les rotations dudit bouton.

7. Système de commande de vitesse de lecture selon la revendication 6, dans lequel ledit moyen de comparaison (5) compare le nombre d'impulsions générées par ledit moyen de génération d'impulsions (2) à une valeur de référence correspondant à ladite vitesse de référence et détermine si le nombre d'impulsions est plus grand que la valeur de référence.

8. Système de commande de vitesse de lecture selon la revendication 7, dans lequel ledit moyen de calcul de moyenne (5) comprend un moyen d'intégration pour intégrer le nombre d'impulsions générées par ledit moyen de génération d'impulsions (5) lorsque ledit moyen de comparaison détermine le nombre d'impulsions est plus grand que la valeur de référence.

9. Système de commande de vitesse de lecture selon l'une quelconque des revendications précédentes dans lequel le moyen de commande (5) stocke une table de la relation entre la vitesse de rotation du bouton (1) et la vitesse de lecture correspondante.

10. Système selon la revendication 9, comprenant en outre un moyen (7) pour changer la table.

FIG. 1

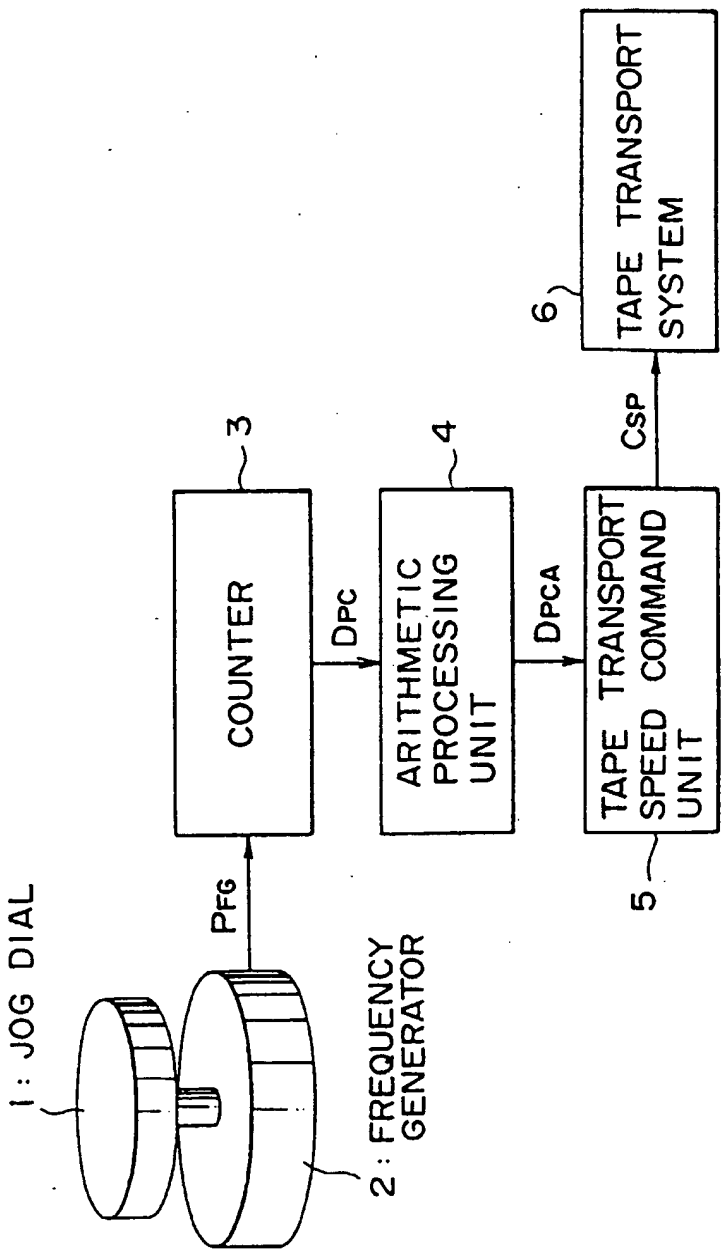

1 : JOG DIAL
2 : FREQUENCY GENERATOR
PFG
COUNTER
3
DPC
ARITHMETIC PROCESSING UNIT
4
DPCA
TAPE TRANSPORT SPEED COMMAND UNIT
5
CSP
6
TAPE TRANSPORT SYSTEM

FIG. 2

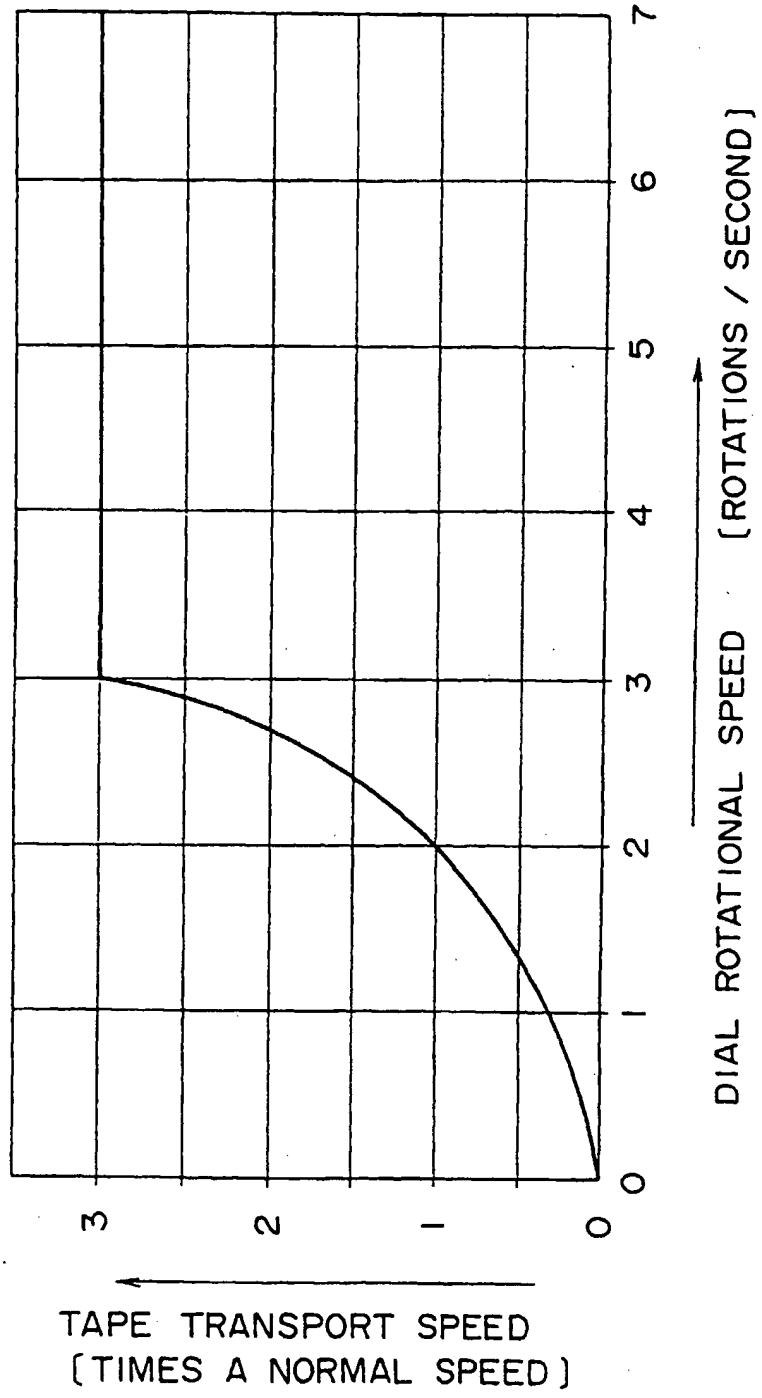

0
1
2
3
4
5
6
7
DIAL ROTATIONAL SPEED [ROTATIONS / SECOND]
3
2
1
0
TAPE TRANSPORT SPEED
[TIMES A NORMAL SPEED]

FIG. 3

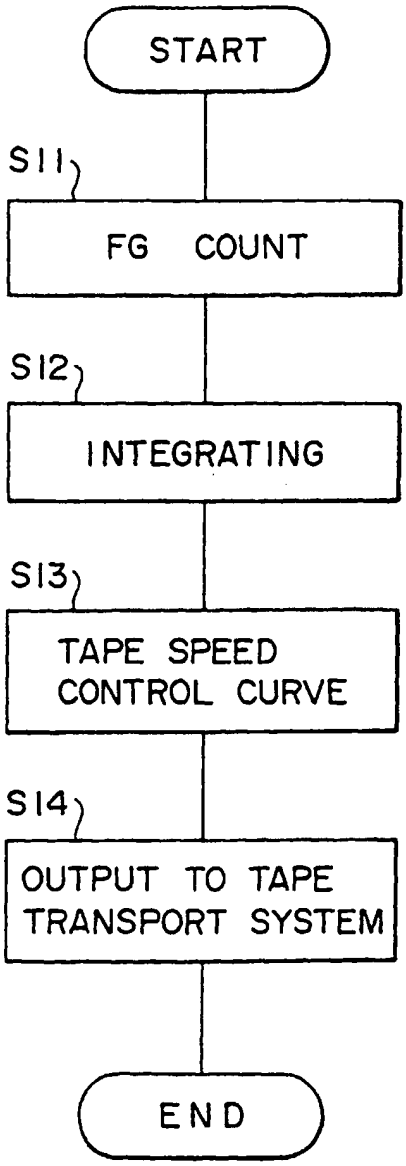

START
S11
FG COUNT
S12
INTEGRATING
S13
TAPE SPEED CONTROL CURVE
S14
OUTPUT TO TAPE TRANSPORT SYSTEM
END

FIG. 4

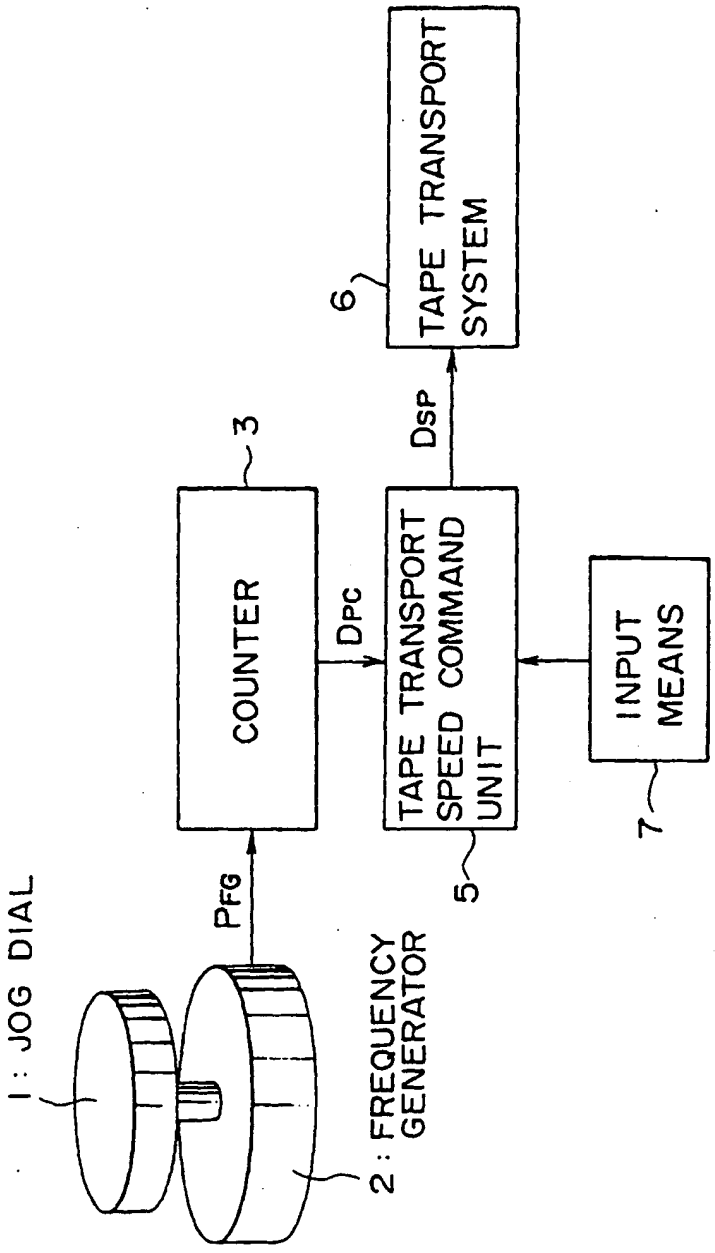

1 : JOG DIAL
2 : FREQUENCY GENERATOR
PFG
COUNTER
3
DPC
TAPE TRANSPORT SPEED COMMAND UNIT
5
DSP
TAPE TRANSPORT SYSTEM
6
INPUT MEANS
7

FIG. 5

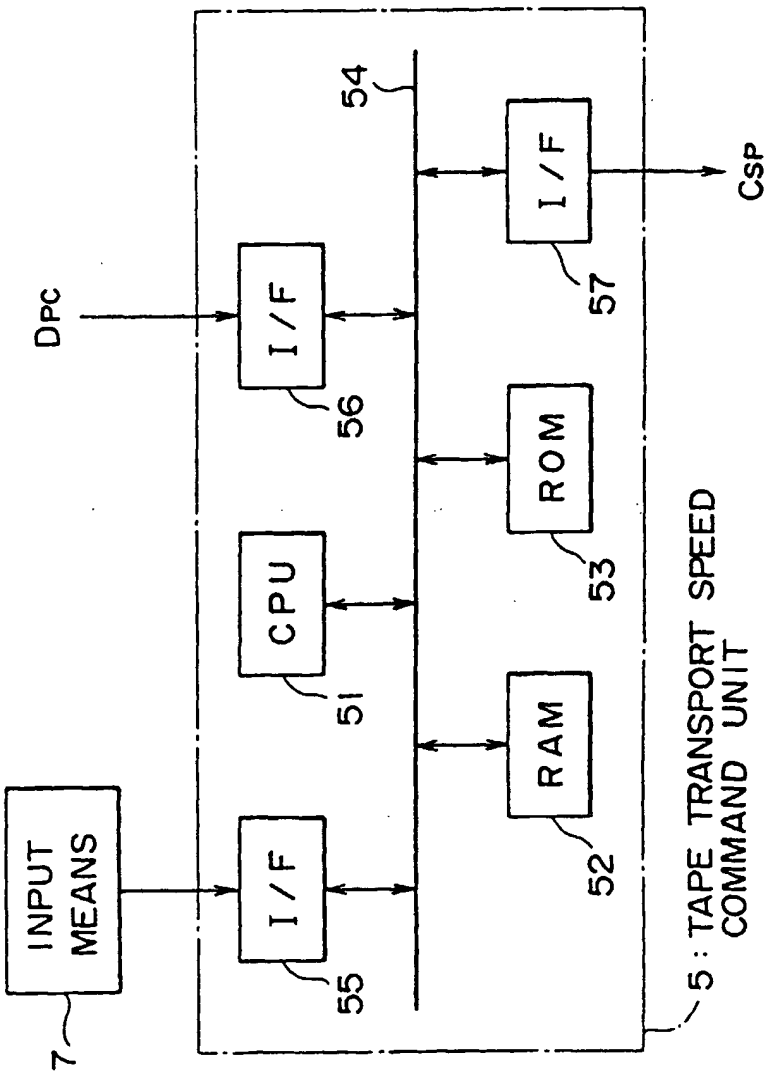

INPUT MEANS
7
I/F
55
CPU
51
RAM
52
ROM
53
54
I/F
56
I/F
57
Dpc
Csp
5 : TAPE TRANSPORT SPEED COMMAND UNIT

FIG. 6

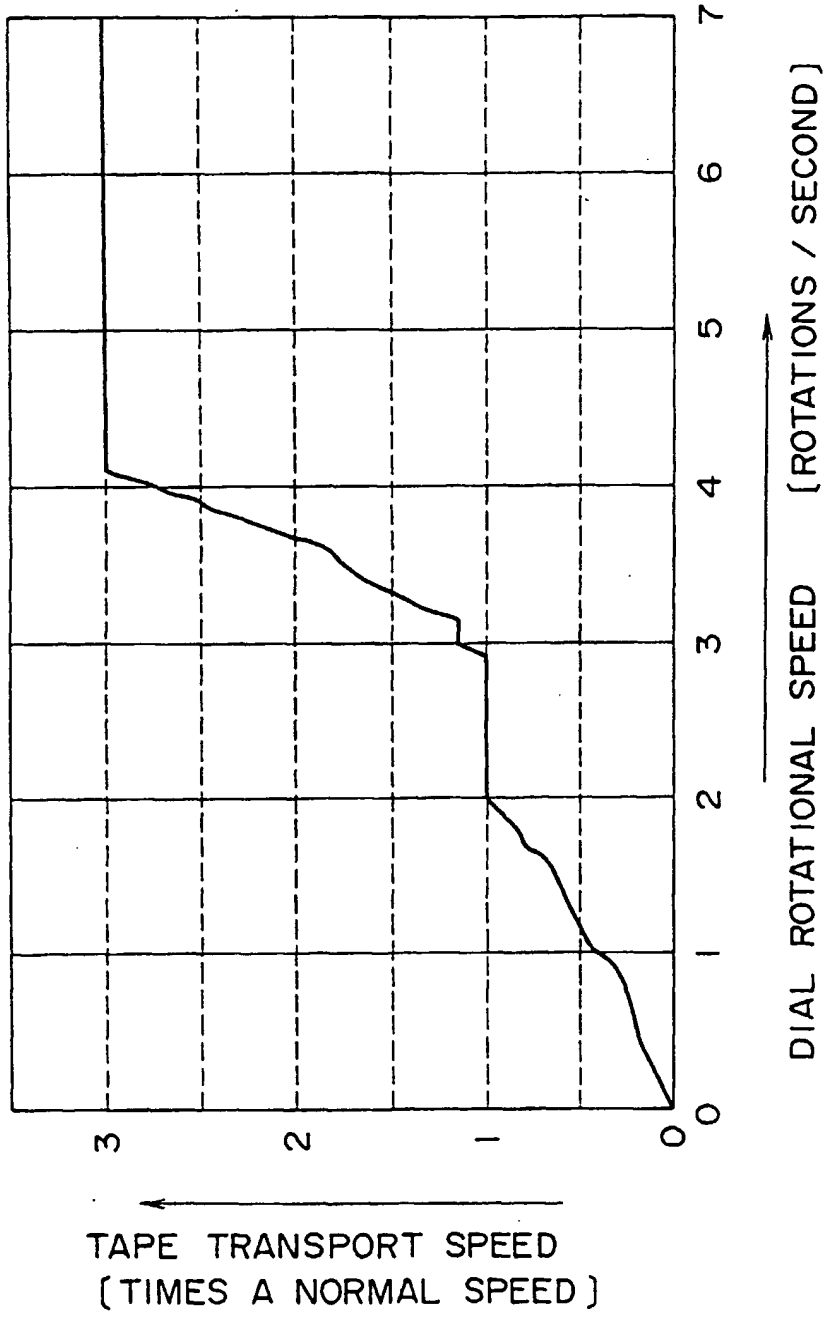

0
1
2
3
4
5
6
7
DIAL ROTATIONAL SPEED [ROTATIONS / SECOND]
3
2
1
0
TAPE TRANSPORT SPEED
[TIMES A NORMAL SPEED]

FIG. 7

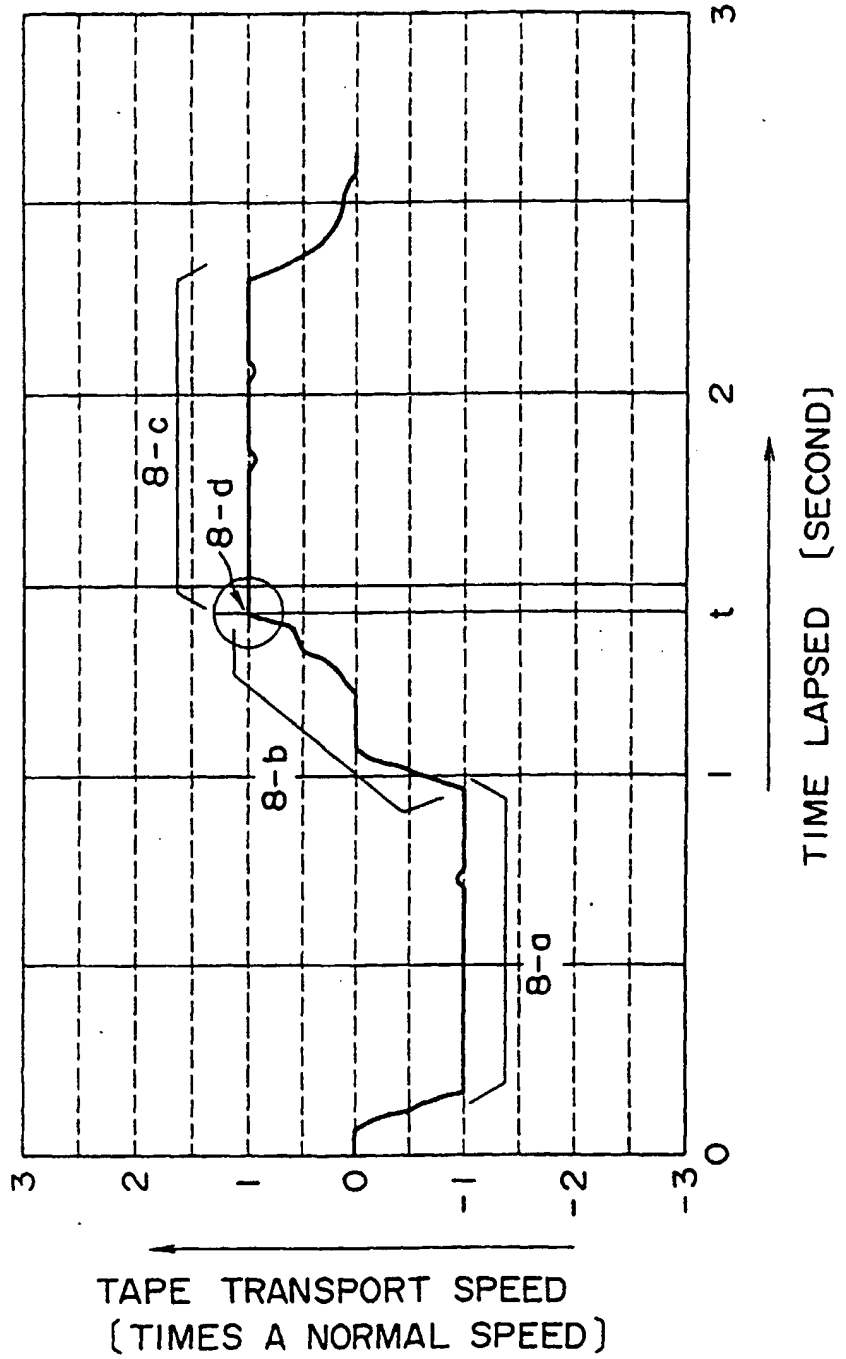

3
2
1
0
-1
-2
-3
t
TIME LAPSED (SECOND)
8-a
8-b
8-c
8-d
TAPE TRANSPORT SPEED
(TIMES A NORMAL SPEED)

FIG. 8

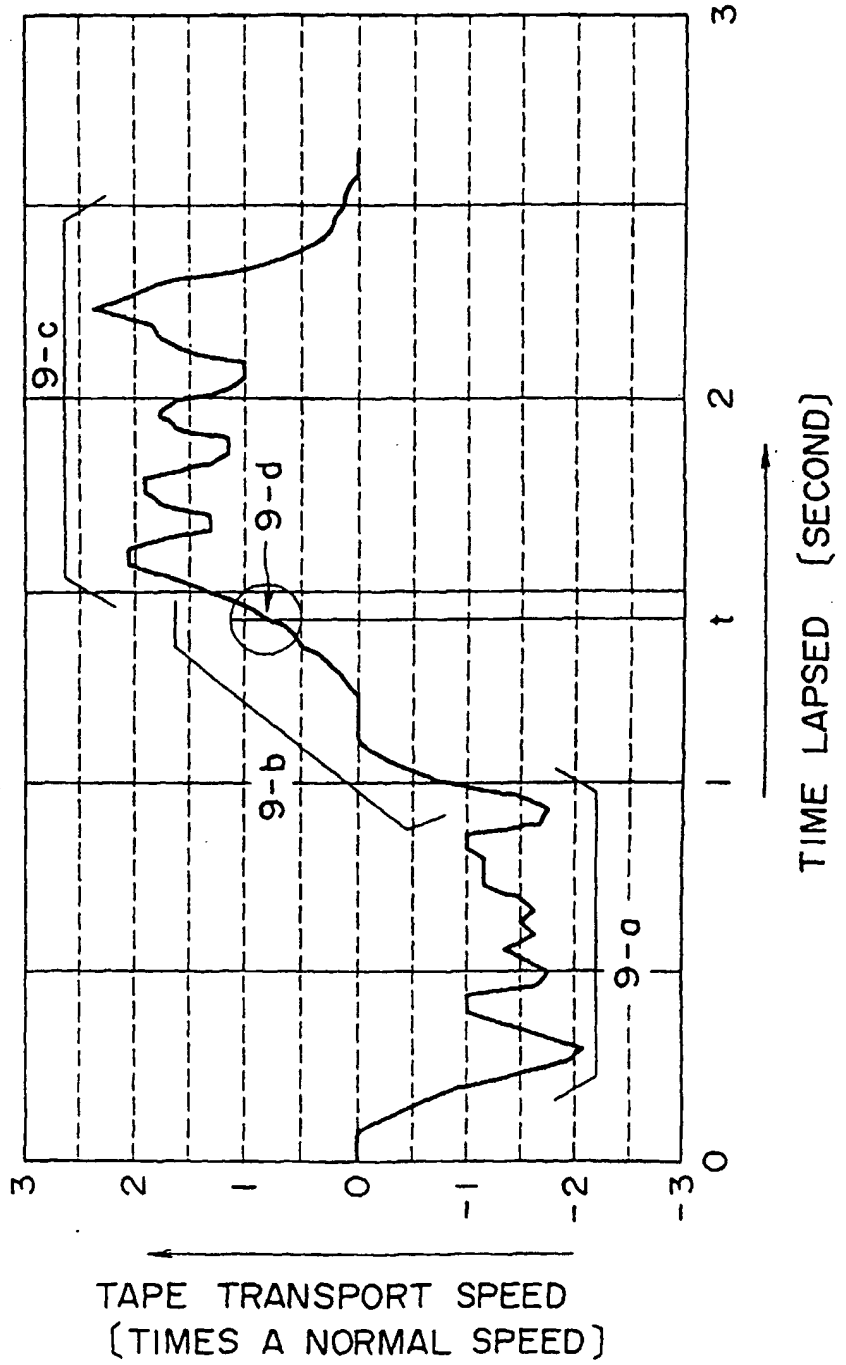

9-c
9-d
9-b
9-a
3
2
1
0
t
TIME LAPSED (SECOND)
3
2
1
0
-1
-2
-3
TAPE TRANSPORT SPEED
(TIMES A NORMAL SPEED)

FIG. 9

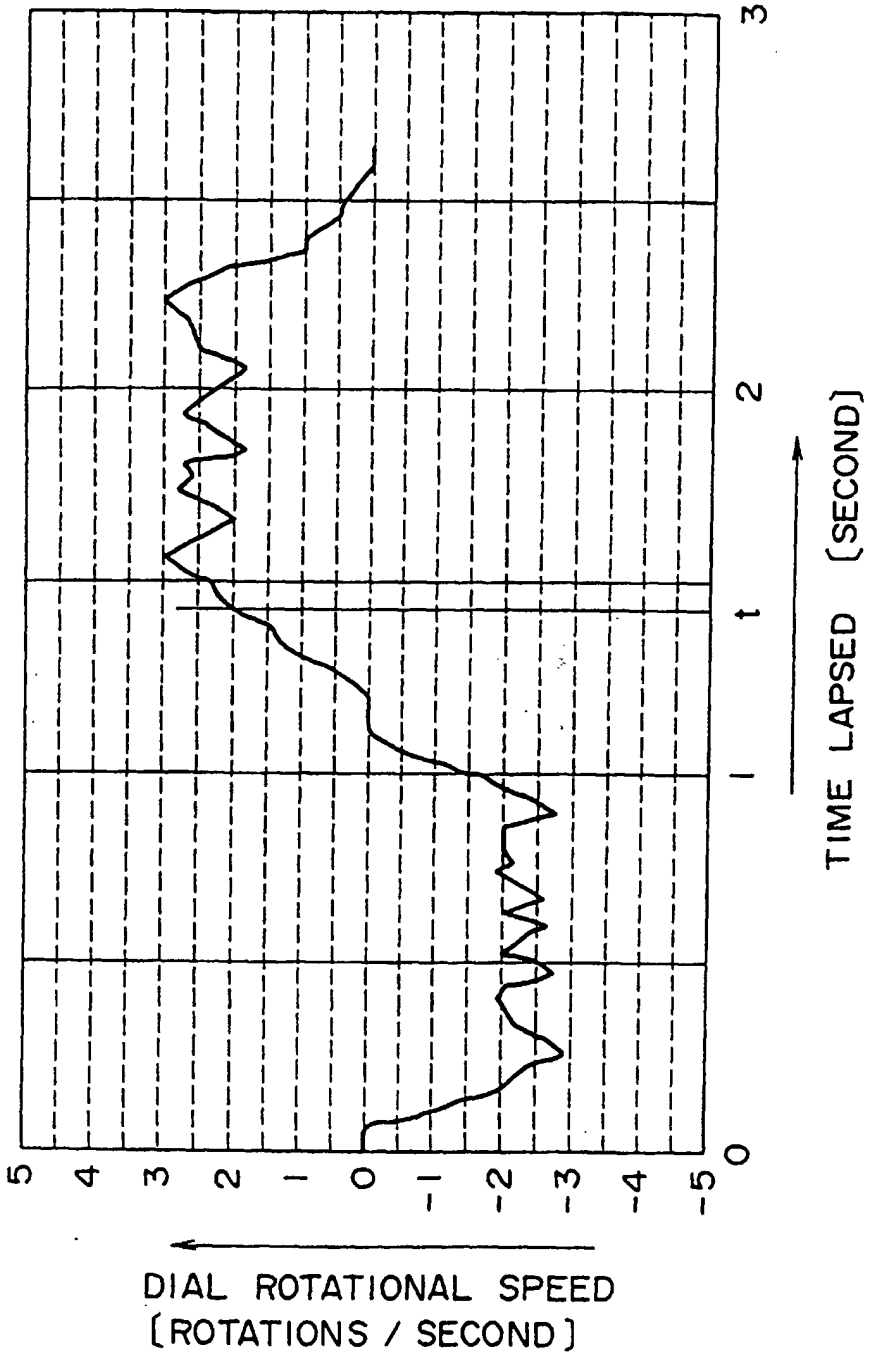
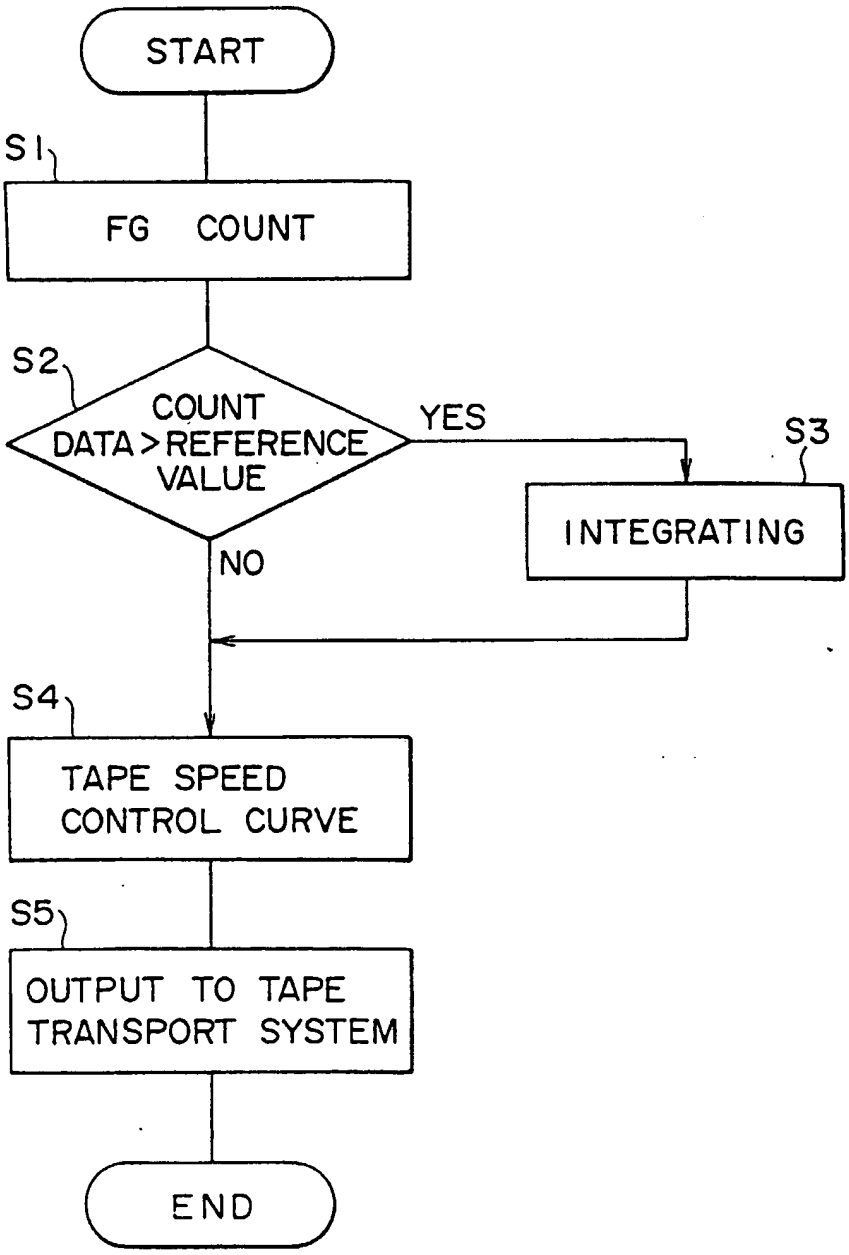

5
4
3
2
1
0
-1
-2
-3
-4
-5
DIAL ROTATIONAL SPEED
[ROTATIONS / SECOND]
0
1
t
2
3
TIME LAPSED [SECOND]

FIG. 10


START
S1
FG COUNT
S2
COUNT DATA > REFERENCE VALUE
YES
S3
INTEGRATING
NO
S4
TAPE SPEED CONTROL CURVE
S5
OUTPUT TO TAPE TRANSPORT SYSTEM
END